

CLAIMS

1.- Automatic handling and transportation device for printer housings characterised in that it comprises:

- 5       a support (31), for support of the housings able to be positioned in alignment with a housing-bearing assembly (51) and in proximity with it; and  
a grasping/holding device (32) able to be displaced between a transferral position in which said grasping/holding device (32) interacts with said housing (2) installed on said housing-bearing assembly (51) to grasp or  
10       free it and a transportation position in which the housing (2) held by the grasping/holding device (32) is on the support (31).

- 2.- Device, according to claim 1, characterised in that it comprises a basic mobile unit (10) associated with a first means of displacement (11, 14) arranged to displace said basic mobile unit (10) on a first route (X); and at least one  
15       handling unit (30) mounted on said basic mobile unit (10), said handling unit (30) including said support (31), which is held in a jutting position on a second route (Y), transversal to said first route (X) and parallel to said housing-bearing assembly (51) mounted in a jutting position on a printing machine (50), and a second means of displacement (35, 39, 40) arranged to displace said  
20       grasping/holding device (32) on said second route (Y) in relation to the support (31).

- 3.- Device according to claim 2, characterised in that the basic mobile unit (10) moves along guide means (1, 3) which extend on said first horizontal route (X) along a stretch which includes a first transfer area in which said handling unit  
25       (30) mounted on the basic mobile unit (10) operates to exchange housings with said printing machine (50), and at least a second transfer area in which the support (31) on the handling unit (30) mounted on the basic mobile unit (10) is able to be positioned in alignment with a housing support (71, 81), installed on a transportation unit (70) or in a place of storage (80), said handling unit (30)  
30       operating to exchange housings with said transportation unit (70), or with said place of storage (80).

- 4.- Device, according to claim 3, characterised in that a single handling unit (30) is mounted on the basic mobile unit (10), and fitted with third means of

displacement (44, 45, 46) arranged to move the handling unit in relation to the basic mobile unit (10) on a third, vertical route (Z), transversal to the first and second routes (X, Y).

5 5.- Device, according to claim 3, characterised in that several handling units (30) are mounted on the basic mobile unit (10) in fixed positions in which the respective supports (31) are at a height coinciding with the height of several housing-bearing assemblies (51) on the printing machine (50), or supports (71, 81) on the transportation unit (70), or the place of storage (80).

10 6.- Device, according to claim 5, characterised in that several housing-bearing assemblies (51) on the printing machine (50) comprise all of the housing-bearing assemblies (51) arranged on one side of the support drum (52) of the printing machine (50).

7.- Device, according to claim 6, characterised in that said fixed positions on several handling units (30) on the basic mobile unit (10) are vertically aligned.

15 8.- Device, according to claim 5, characterised in that said fixed positions of the various handling units (30) on the basic mobile unit (10) are such that the respective supports (31) can be aligned at once with various housing-bearing assemblies (51) on the printing machine (50) or supports (71, 81) on the transportation unit (70), or the place of storage (80).

20 9.- Device, according to claim 8, characterised in that various housing-bearing assemblies (51) on the printing machine (50) comprise all of the housing-bearing assemblies (51) on both sides of a support drum (52) on the printing machine (50).

25 10.- Device, according to claim 9, characterised in that supports (71, 81) on the transportation (70) and/or the place of storage (80) are in identical positions relative to the housing-bearing assemblies (51) on the printing machine (50).

30 11.- Device, according to claim 3, characterised in that the basic mobile unit (10) comprises a lower section (13) fitted with wheels (14) in contact with at least one way (1) which forms part of said guide-means (1,3) on the first route (X) at least one of said wheels (14) being a tractor wheel activated by motor (11) and an elevated section (15) on which supports the handling unit (30).

12.- Device, according to claim 3, characterised in that said second means of displacement (35, 39, 40) comprises guide means (40) on the second route (Y), adjacent to the support (31), with which is associated a saddle (39) to which is connected the grasping/holding device (32), and a motor (35) connected and arranged to move said saddle (39) along said guide means (40).

13.- Device, according to claim 12, characterised in that it comprises means of transference (33, 37, 38) arranged to transfer said support (31) on said second route (Y) in order to bring the furthest extremity of the support (31) close to the furthest extremity of the housing-bearing assembly (51) or support (71, 81) when the support (31) is in alignment with the same.

14.- Device, according to claim 13, characterised in that said means of transfer (33, 37, 38) comprises guide means (38) on the second route (Y), with which is associated a saddle (37) to which is fixed an extremity of the support (31), and a motor (33) connected and arranged to move said saddle (37) along said guide means (38).

15.- Device, according to claim 14, characterised in that said guide means (40), along which said saddle (39) moves, bears the grasping/holding device (32) fixed to said saddle (39), bearing the support (31) and moving along the same.

16.- Device, according to claim 3, characterised in that said grasping/holding device (32) comprises a tubular body (41) mounted to slide along the support (31) and provided with an external surface at one extremity (42) arranged to couple with the internal surface of an extremity of the housing (2) facing a section of the smaller diameter of the housing-bearing assembly (51) or support (71, 81), and at least one bore (34) through said tubular body (41), open at said external surface.

17.- Device, according to claim 16, characterised in that said means of activation (34, 49) of the grasping/holding device (32) comprises first valves arranged to connect said bore (34) to a source of compressed air (49), with which it facilitates a slight dilation of the extremity of the housing (2) for said coupling and then disconnecting the bore (34) from said source of compressed air (49), facilitating recovery of the form of the extremity of the housing (2) and a tightening of the furthest extremity (42) of the tubular body (41).

18.- Device, according to claim 17, characterised in that said valves are arranged also to connect said bore (34) to a vacuum source once disconnected from the source of compressed air (49).

5 19.- Device, according to claim 16 or 17, characterised in that the first valves connect alternatively with second valves arranged to connect injection nozzles incorporated into the housing-bearing assembly (51) or support (71, 81) to a source of compressed air in order to create an air cushion between the housing (2) and the housing-bearing assembly (51) or support (71, 81) with which to facilitate a sliding movement between the two.

10 20.- Device, according to claim 3, characterised in that said third means of displacement (44, 45, 46) comprises guide means (44), arranged on the third route (Z) along an elevated section (15) of the basic mobile unit (10), with which is associated a saddle (45) on which is mounted a handling unit (30), and a motor (46) connected and arranged to move said saddle (45) along said guide  
15 means (44).

21.- Device, according to claim 3, characterised in that the support (31, 71, 81) has the form of a mandril in a jutting position and incorporates at least one radial centring device (47, 48) to align the housings (2) coaxially with the support (31).

20 22.- Device, according to claim 21, characterised in that said radial centring device (47, 48) includes at least two pivoting arms (47), each with a wheel mounted at its furthest point activated by an actuator (48) to project from the external surface of the support (31) or to be hidden inside the same.

23.- Device, according to claim 11, characterised in that a basic mobile  
25 unit (10) also comprises an upper section (16) fitted with wheels (17) in contact with at least one upper way (3) which forms part of the guide means (1, 3) on the first route (X).

24.- Device, according to claim 23, characterised in that said upper way  
30 (3) has associated with it, along the length of the same, at least one electrical supply conducting track (43) and/or control signals and said upper section (16) of the basic mobile unit (10) including a dynamic electrical current input device (18) to supply said electrical current and/or signals from said track (43).

25.- Device, according to claim 3, characterised in that it comprises a positioning device on the first route (X) made up of at least one detector chosen from a group which includes a telemeter, a codifier and an optical gauge connected to electronic processing means arranged to control the activation of  
5 said first means of displacement (11, 14).

26.- Device, according to claim 24, characterised in that said positioning device on the first route (X) also includes at least one photoelectric sensor connected to said electronic processing means for control of the activation of said first means of displacement (11, 14) in order to refine the positioning carried  
10 out by said detector.

27.- Device, according to claim 3, characterised in that it comprises a positioning device in third route (Z) made up of a detector chosen from a group including a telemeter, a codifier or an optical gauge connected to electronic positioning means arranged to control the activation of said third means of  
15 displacement (44, 45, 46).

28.- Device, according to claim 27, characterised in that said positioning device on the first route (Z) includes also at least one photoelectric sensor connected to said electronic positioning means for controlling the activation of the third means of displacement (44, 45, 46) in order to refine the positioning  
20 carried out by said detector.

29.- Device, according to claim 5, characterised in that said transportation unit (70) comprises a raising and lowering device activated by a means of activation and arranged to lower the supports (71) to heights suitable for handling the housings (2), and for raising the supports (71) to said heights  
25 coinciding with the height of the supports (31) of the various handling units (30) mounted on the basic mobile unit (10) in fixed positions.

30.- Device, according to claim 2, characterised in that said handling unit (30) is mounted on said basic mobile unit (10) by means of a means of rotation arranged to rotate the handling unit (30) in relation to the basic mobile unit (10)  
30 around an axis parallel to the third vertical route (Z), transversal to the first and second (X, Y), and at a certain angle with respect to the second route (Y).

31.- Device, according to any preceding claims characterised in that said support (31, 71, 81) has the form of a mandril (31) in a jutting position with the

furthest extremity able to be facing, with or without contact, said housing-bearing assembly (51).

- 32.- Device, according to any claim 1 a 30, characterised in that said support (31, 71, 81) has the form of a cradle with an extremity able to be situated
- 5 in alignment with said housing-bearing assembly (51).